

Traditional Clinical Outcomes in Prelicensure Nursing Education: An Empty Systematic Review

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ABSTRACT

Background: Effectiveness of traditional apprenticeship models used in undergraduate nursing education has been questioned in the literature for over 50 years. This systematic review aimed to examine best evidence available upon which to base decisions regarding use of traditional clinical experience with prelicensure nursing students. **Method:** A systematic review was conducted following Joanna Briggs Institute and Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Nine electronic databases were searched. Full-text review was completed for 118 articles meeting inclusion criteria. **Results:** No studies reported learning outcomes attributed to clinical education models, resulting in an empty review. Studies were commonly self-reports of perceptions and confidence, lacking quantitative outcomes. **Conclusion:** No sufficient evidence was found to support traditional clinical models. The scope of nursing practice and patient complexity requires higher order thinking skills, ability to prioritize, and leadership in interdisciplinary care environments. This review raises serious concerns about how nurse educators assess learning in traditional clinical environments. [*J Nurs Educ.* 2021;60(3):136-142.]

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Many prelicensure nursing program administrators, faculty, and clinical educators assume that the traditional clinical experience—characterized by a student completing a prescribed period of time in one or more clinical settings and accompanied by a nursing educator or preceptor—yields the expected knowledge, skills, and attitudes required to attain competence as a nurse in that setting. As long-standing nurse educators, past clinical instructors, and investigators for this systematic review, we recognize the traditional clinical model, by default, is the primary approach to deliver clinical nursing education. In recent years, health care educators in clinical and educational environments began implementing alternative clinical education models that incorporate diverse pedagogical approaches. For example, various types of simulation-based learning experiences have supplemented or replaced up to 50% of traditional clinical experiences (Hayden et al., 2014). Curiosity about nursing's reliance on, and assumptions about, traditional clinical models and their efficacy formed the impetus for this systematic review. These assumptions have been questioned repeatedly in the literature for more than 50 years (Bowling et al., 2018; Budgen & Gamroth, 2008; Calman et al., 2002; Monahan, 1991; Williams et al., 2001), yet the educational model has remained essentially unchanged (Billings & Halstead, 2016).

Both medicine and nursing rely on variations of the clinical apprenticeship model (Billings & Halstead, 2016; Kavanagh & Szweda, 2017); however, “the current system of education, training, and maintenance of proficiency has itself never been tested rigorously to determine whether it achieves its stated goals; the high level reviews of the performance of the health care industry suggest that it does not” (Gaba, 2004, p. i7). As far back as 1995, nurse researchers examining the efficacy of traditional clinical placements have suggested that given the known limitations of traditional clinical nursing education, such as minimal quality learning time with clinical faculty, the use of this model should not be perpetuated (Polifroni et al., 1995). In fact, Benner et al. (2015) reported that although graduates pass the licensure examination, they are not prepared to manage the complexities of nursing practice. Traditional clinical assignments may result in educators' time being focused on supervising

ing skills (Ironside & McNelis, 2010), rather than focusing on deep learning with integration of theory and practice and clinical decision making in context (Nielsen et al., 2013).

Without an evidence base to guide change, nursing faculty teach the same way they were taught despite the dramatic changes in the health care environment and nursing's scope of practice (Tanner, 2006). Numerous alternate models have been created to try to manage the complexity of the clinical environment (Billings & Halstead, 2016); however, most have not been extensively studied for effectiveness. For example, faculty preparation for the educator role in nursing education remains unclear and unstandardized. Although a master's degree is a common requirement for teaching undergraduate nursing, a recent study of 529 nursing education master's programs showed that only half of the National League for Nursing Core Competencies for Nurse Educators were well-represented in their curricula, and programs had wide variation in credit and practica hours (Fitzgerald et al., 2020). Similarly, requiring a PhD degree to teach undergraduate nursing is not necessarily helpful for developing the evidence of pedagogy because these programs often do not include any education courses (Oermann & Kardong-Edgren, 2018). Despite lacking evidence-based clinical models and variations in educational programs to prepare faculty for clinical teaching, the ongoing reliance on the traditional method continues.

Traditional clinical experiences, in this systematic review, were defined as "practice in an inpatient, ambulatory care or community setting where the student provides care to patients under the guidance of an instructor or preceptor" (Alexander et al., 2015, p. 40). Assessment of clinical practice competencies include observation and self-assessments using scales that may or may not have been tested for reliability and validity, objective structured clinical evaluations with varying reliability and conducted later in a simulation environment, knowledge examinations, bedside tests, and direct observations of practical skills (Reljic et al., 2017). Clinical activities are often graded pass/fail, are subjective in nature, and are completed by various instructors without having established interrater reliability for the evaluation tool in use. Clinical experiences are frequently supplemented with graded written assignments, such as care plans and case studies. Summative assessment of clinical performance is prone to subjective bias and inconsistency of quality between assessors (Helminen et al., 2016). There may be guidelines about the number of clinical hours required depending on the type of program and the state, jurisdiction, or country in which the program is located; however, traditional clinical experiences are foundational to undergraduate nursing education worldwide.

Despite many components of nursing education that have evolved over time, such as lecture, skills laboratory, and simulation, clinical practice with real people has remained relatively unchanged and is considered irreplaceable in developing competency as a nursing professional (Jayasekara et al., 2018). To challenge this long-established and accepted model, a systematic review of quantitative studies on student learning outcomes was conducted to examine the best evidence available upon which to base decisions regarding the use of traditional clinical experience in prelicensure programs.

METHOD

A systematic review was chosen as the framework for this study with the goal of synthesizing a comprehensive body of research literature using the rigorous methods set out by the Joanna Briggs Institute (JBI) (Aromataris & Munn, 2017). The Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines (Moher et al., 2009), supported by JBI, were adhered to for conducting and reporting this review. The review team included four nurse educators with expertise in traditional clinical education and a health sciences librarian who conducted searches of nine databases in fall 2018: CINAHL® Plus, MEDLINE®, ERIC™, Scopus®, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, Global Health, PsycINFO®, and JBI Evidence-Based Practice Database. The search was replicated late May 2019 to identify newly published research findings. Searches were limited to English language reports of quantitative outcomes from any country without limitation to year of publication and published in both peer-reviewed and nonpeer-reviewed journals. Studies on any type of clinical model for prelicensure nursing education were included. Randomized control trials would have been included; however, none were found in the searches. Exclusion criteria included student learning outcomes related to simulation or skills laboratory education or training to ensure an exclusive focus on traditional clinical models. We also excluded research focused on perceptions of learners or educators, opinion articles, commentaries, editorials, and nonresearch findings. Although valuable insights can be gleaned from exploring learners' perceptions about clinical experiences and related self-efficacy, often learner perception does not mirror actual clinical competence (Baxter & Norman, 2011; Liaw et al., 2012).

The list of search terms was developed based on examination of systematic reviews related to clinical education of undergraduate nurses, and 43 search terms (Table 1) were identified as current and historical descriptors of traditional clinical education. The search was conducted using these search terms with Boolean operators that included *NOT simulation* and *NOT skills laboratory*.

Initial search results were screened for inclusion criteria of research reports written in English language. The PRISMA Flow Diagram (Figure 1) shows 1,239 records reduced to 539 when duplicates were removed. Pairs of research team members reviewed each abstract. Disagreement over whether to include an abstract for full text review was resolved through discussion. If agreement was not attained, the full-text manuscript was reviewed. After each group of 200 abstracts were reviewed, the research team met to reestablish interrater reliability through discussion of inclusion and exclusion criteria, with focus on the aim of the study. Additionally, the primary author reviewed all abstracts. A resulting 118 full-text articles were assessed for eligibility. As with the abstracts, each article was evaluated by two members of the research team. Disagreements over inclusion were brought to the full research team, and discussion ensued until consensus was reached.

TABLE 1
Search Terms for Systematic Review^a

Clinical models	Prelicensure
Clinical	Baccalaureate
Placement	Associate
Learning environment	Diploma
Environment	Education
Education	Nursing education
Experience	Nursing student
Training	Methods
Rotation	Cognitive task analysis
Setting	Evaluation of clinical experiences
Unit	
Hours	
Teaching models	
Supervised	
Traditional	
Clinical experience	
Clinical education	
Clinical model	
Nursing education workplace experience	
Practice-based clinical	
Hospital-based nursing education	
Apprenticeship, hospital-based	
Preceptor	
Preceptorship	
Ward-based learning	
Religious-based nursing education	
Practicum	
Faculty-supervised practicum	
Clinical education unit	
Dedicated education unit	
Collaborative clinical placement	
Mentor-arranged clinical practice placement model	
Cluster clinical model	
Mentorship clinical model	
Partnership clinical model	
Hub and spoke clinical model	

^aNOT simulation, NOT skills laboratory.

RESULTS

The research team assumed that an educational practice that

had been used for more than half a century would have a plethora of published studies on the effectiveness of traditional clinical education. Yet, our systematic review of quantitative research literature exploring student learning outcomes attributed to any type of prelicensure nursing clinical education experience found no eligible studies and the result was declared an empty review. Empty reviews were first acknowledged by Lang et al. (2007) and although they make important contributions to science, they have the potential to mislead readers if information from excluded studies is not reported (Green et al., 2007). Lang et al. (2007) recommended that information about the ineligible studies be included. For example, in an empty review by San Lazaro Campillo et al. (2017), none of the studies met the inclusion criteria but the authors thought there was useful information to share. Therefore, an overview of the studies reviewed is presented, including a discussion of four studies that were deliberated on but were ultimately determined not to meet criteria for various reasons.

OVERVIEW OF STUDIES REVIEWED

Student Learning Outcomes

In the literature reviewed, outcomes were most often student self-report, and predominantly student perceptions of the clinical experience, what they learned, or about the effectiveness of their instructor. Reported outcomes also included self-perceptions of confidence to

complete a skill or care for a patient. This seems to make sense as theory suggests that self-confidence is important for skill development (Bandura, 1986); however, research also repeatedly

demonstrates that self-report of confidence often does not match actual competence (Baxter & Norman, 2011; Davis et al., 2006; Kruger & Dunning, 1999; Liaw et al., 2012; Whyte et al., 2009).

When investigators attempted to collect objective indices of student learning, the measurement instruments had significant flaws. Typically, instructor-developed measures had no theoretical framework and did not use accepted stages of psychometric scale development.

Final Four Studies

As stated previously, four studies were retained in the final analysis (Table 2); however, in the end, they did not meet the criteria for inclusion either. The strengths of each of these studies are summarized, as well as the reason they were omitted from the review.

Danner (2014) compared competency achievement in students randomly assigned to two groups: one 12-hour clinical day, or two 7- or 8-hour clinical days. The investigator developed a Clinical Evaluation Tool (CET) to measure learning outcomes; however, no reliability or validity testing was reported. Of the eight items on the scale, some were not observable behaviors and two contained different concepts that should have been placed in separate questions as students could perform one and not the other (e.g., administers medications in compliance with safety standards and evaluates medication effectiveness).

Parchebafieh et al. (2014) compared learning outcomes (knowledge and skill) of students randomly assigned to either a clinical teaching associate model or a traditional training group. The measures were faculty developed: (a) clinical knowledge was a 23-item multiple choice test and (b) clinical skills were assessed on a 30-item checklist. Although the reliability for the knowledge test was reported, it was not clear how this directly related to student learning in the clinical setting. No information about validity and reliability was provided for the skills checklist.

Rahnavard et al. (2013) also used a random assignment to a clinical teaching associate model or a traditional group, and clinical skills were the outcome variable. The researcher-constructed checklist contained 71 items covering eight domains that were

scored as appropriate or inappropriate performance. No information was provided supporting the validity or reliability of the checklist, and the specifics of the educational intervention were not reported.

Makarem et al. (2001) examined teaching effectiveness on student learning outcomes measured by the Basic Knowledge Assessment Tool (BKAT-5) and the CET. Although the BKAT-5 is a valid and reliable instrument, it measures basic knowledge for critical care nursing. The CET is composed of 10 clinical learning indicators derived from course objectives; however, no validity and reliability of the tool was reported. Further, the researchers used student and instructor versions for the study and combined the scores to reflect student learning. The original CET author (Krichbaum, 1994) did not describe this methodology and there was no explanation for combining the scores.

DISCUSSION AND IMPLICATIONS FOR EDUCATORS

The results of this systematic review were unexpected given that the traditional model of clinical education for nursing has

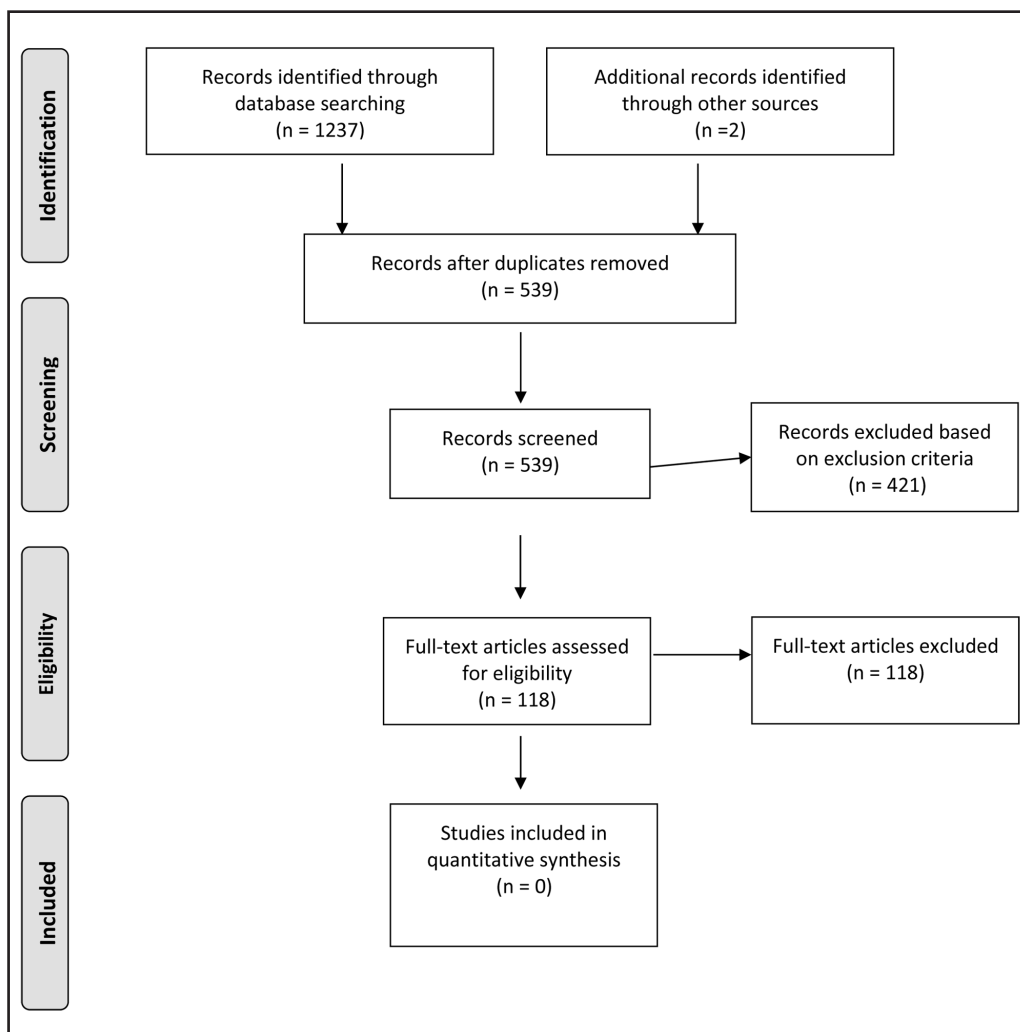


Figure 1. PRISMA flow diagram.

TABLE 2

Studies Considered Before Excluding From Study

Study	Concerns	Reason for Exclusion
Danner (2014)	Methodology, instrument	Faculty developed subjective observation tool for the study with no reliability and validity testing of the tool. Many of the items are not observable or double-barreled.
Parchebafieh et al. (2014)	Methodology, instruments	Three faculty-developed tools; one of the three tools evaluated for validity but unsure which questionnaire (called test, checklist, and questionnaire); half-split method used to assess test; however, the results and items not shared.
Rahnavard et al. (2013)	Methodology, intervention, and reporting of findings	Unable to identify the intervention; reported higher scores after intervention but did not collect pretest data; method used postconference environment to do didactic teaching.
Makarem et al. (2001)	Methodology, tool validity, and combining of findings	Citations related to content validity of tool were not accurate as attributed to before the tool was developed; developed student and faculty tool for self-rating (perceptions) and then combined the results.

been used for decades. Additionally, as educational research has been increasingly supported and modestly funded, it was anticipated that high-quality, methodologically rigorous studies had been conducted and findings published. Although it is possible that some programs have objective clinical outcomes but have not published them to date, that likely represents a relatively small number and the lack of evidence remains surprising. The increased commitment to educational research has been particularly true in the United States, yet three of the four studies retained until the final cut were conducted in developing countries. Perhaps it is not surprising that the outcomes of traditional clinical education have not been rigorously evaluated, as until now there were not viable alternatives to the status quo. The increasingly restricted clinical environment and the disruptive influence of simulation have called many previously unchallenged practices into question (Bowles et al., 2014; Waxman et al., 2019). This empty review highlights a major gap in the nursing education literature and provides direction and opportunity for future researchers and clinical educators.

Several core issues were identified in the literature that contribute to empty reviews (Yaffe et al., 2012). The first is newness of the area of study. Based on our exhaustive review of the literature that was not limited by year published (studies were reviewed with publication dates ranging from 1983 to 2018), the issue does not apply for this topical area. The second issue is that the scope of a review may be so highly specific that it excludes most published research. The inclusion criteria used in this review were broad to encompass studies in nursing education that focused on learner outcomes. The third core issue of high-quality evidence was encountered in this empty review, as no student learning outcomes derived from valid and reliable measures were found in any of the reviewed studies. The few existing clinical tools used in the reviewed studies should be psychometrically evaluated for use. Moreover, many reliable and valid tools are available in the simulation literature that could be adapted and tested for use in the traditional clinical environment.

Clinical educators and curriculum committees may want to consider focusing less on actual clinical hours and more on

expected performance and evaluation of behaviors and skills (Mancini et al., 2019). Traditional clinical education consists of random learning opportunities dependent on the patient census, and often staff nurses, on the assigned day. This prohibits standardization of learning experiences and a guarantee that all students receive the same clinical education. Further, the variability of clinical educator competencies may contribute to lack of consistent learning experiences. Finally, the clinical instructor may have responsibility for students in several physical locations, limiting their ability to provide proper supervision and assess performance.

A recent study by Sullivan et al. (2019) found that students in simulation performed at higher levels and accomplished more learning goals in half the time, compared with the traditional clinical environment. Simulation allows educators, after identifying the desired competencies, to design standardized simulations to ensure that specific competencies are practiced and evaluated. This could lead to benchmarking what is actually occurring with competency attainment during clinical experiences, while gaining a more objective perspective on what knowledge, skills, and attitudes are best evaluated in each type of clinical experience.

To build the evidentiary base of student learning outcomes in the clinical setting, several key steps need to occur. First, a predetermination of expected outcomes and competencies will help faculty to identify what model best provides opportunity for students to meet the outcomes. Second, development and testing of valid and reliable tools measuring identified outcomes and competencies is vital. Finally, using these tools across programs and settings is needed to support decision making regarding clinical education models and student attainment. Educators can borrow theory and evidence-based practices from simulation to guide these steps. As a new and costly innovation in clinical education, simulation was held to a high standard of evidence, resulting in extensive publications about how various learning theories apply to active learning, including traditional clinical models. The INACSL Standards of Best Practice: SimulationSM, which are evidence based, also provide guidance

applicable to traditional clinical settings (INACSL Standards Committee, 2016).

CONCLUSION

For more than 50 years (Tanner, 2006), nursing education programs have been using essentially the same apprenticeship model for clinical education; however, the profession and the patient population have changed. The scope of nursing practice has expanded, requiring an unprecedented increase in expected knowledge and required skills. Patients have become increasingly complex as advanced medications and technology have increased life expectancy. Nurses need higher order thinking and prioritization abilities, as well as leadership skills in interdisciplinary care environments to work with these patients and to address the rise in documented cases of medical errors (Makary & Daniel, 2016). Despite these changes in patient care and scope of practice, the clinical education model has hardly evolved beyond the apprenticeship model, and our means of evaluating students in the clinical setting has similarly remained underdeveloped, as demonstrated by the findings of this empty review.

The results of this empty systematic review are alarming. How is it that current published attempts at research regarding clinical outcomes of traditional clinical models are so few in number and demonstrate poor methodology? Teaching and learning approaches do not work in isolation, whether learning technologies, simulation, or traditional clinical placement hours. What is needed is synergistic curricular design where each facet of a given activity or strategy potentiates the next and is supported by proven measurable results. It will never be the simple bolting or unbolting of traditional or simulation learning hours from nursing programs that will ensure measurable clinical outcomes. Instead, we must use an integrated, holistic, curriculum-centered instructional design approach to clinical teaching and learning viewed within the broader curriculum. Nurse educators must acknowledge the state of the science and, more importantly, look to the future to improve educational programs.

We suggest that through innovation, sound scientific inquiry, and solutions-testing of alternate models, nurse educators can learn how best to prepare students for increasingly complex health care environments and patient care. Significant funding is needed to support this type of rigorous inquiry, yet the amounts available remain inadequate (Broome et al., 2012).

This systematic review raises serious questions about nursing education's continued reliance on traditional clinical models and related assessment, evaluation, and measurement of clinical outcomes. Although this review considered only undergraduate nursing education, the apprenticeship model of traditional clinical education is used by many other health care professions. We encourage further study in all disciplines, particularly with the focus placed on interprofessional learning and practice. According to Gaba (2004), "The health care system places a premium on basic science education and leaves most clinical training to a relatively unsystematic apprenticeship process" (p. i2).

We uncovered no studies that met the criteria used for inclusion in this systematic review. Is it plausible that educators

lack requisite knowledge, skills, and tools for comprehensive measurement of student learning outcomes? The results of this study highlight the importance of nursing program administrators and nurse educators employing robust methods in the development of tools to measure clinical learning outcomes. We appear to lack the ability to assess and evaluate one of the most important and critical components of the curriculum and feel comfortable with using a low threshold of pass/fail even as we hold the didactic component to a much higher standard. Society and our profession deserve and expect nurses who are prepared to deliver high-quality care, which starts with evaluating teaching and learning using rigorous methods, including valid and reliable instruments.

REFERENCES

- Alexander, M., Durham, C., Hooper, J. I., Jeffries, P. R., Goldman, N., Kardong-Edgren, S., Kesten, K. S., Spector, N., Tagliareni, E., Radtke, B., & Tillman, C. (2015). NCSBN simulation guidelines for prelicensure nursing programs. *Journal of Nursing Regulation*, 6(3), 39–42. [https://doi.org/10.1016/S2155-8256\(15\)30783-3](https://doi.org/10.1016/S2155-8256(15)30783-3)
- Aromataris, E., & Munn, Z. (2017). JBI systematic reviews. In E. Aromataris & Z. Munn (Eds.), *Joanna Briggs Institute reviewer's manual*. The Joanna Briggs Institute. <https://reviewersmanual.joannabriggs.org/>
- Bandura, A., & National Institute of Mental Health. (1986). *Prentice-Hall series in social learning theory: Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- Baxter, P., & Norman, G. (2011). Self-assessment or self deception? A lack of association between nursing students' self-assessment and performance. *Journal of Advanced Nursing*, 67(11), 2406–2413. <https://doi.org/10.1111/j.1365-2648.2011.05658.x> PMID:21517941
- Benner, P., Sutphen, M., Leonard, V., & Day, L. (2015). *Educating nurses: A call for radical transformation five years later*. Jossey-Bass.
- Billings, D. M., & Halstead, J. A. (2016). *Teaching in nursing: A guide for faculty*. Elsevier.
- Bowles, K., Haines, T., Molloy, E., Maloney, S., Kent, F., Sevenhuysen, S., & Tai, J. (2014). *The costs and benefits of providing undergraduate student clinical placements for a health service organisation: An evidence check rapid review brokered by the Sax Institute for the Hunter and Coast Interdisciplinary Training Network through the Health Education Training Institute*. HETI.
- Bowling, A. M., Cooper, R., Kellish, A., Kubin, L., & Smith, T. (2018). No evidence to support number of clinical hours necessary for nursing competency. *Pediatric Nursing*, 39, 27–36. <https://doi.org/10.1016/j.pedn.2017.12.012> PMID:29525213
- Broome, M. E., Ironside, P. M., & McNelis, A. M. (2012). Research in nursing education: State of the science. *Journal of Nursing Education*, 51(9), 521–524. <https://doi.org/10.3928/01484834-20120820-10> PMID: 22909046
- Budgen, C., & Gamroth, L. (2008). An overview of practice education models. *Nurse Education Today*, 28(3), 273–283. <https://doi.org/10.1016/j.nedt.2007.05.005> PMID:17629596
- Calman, L., Watson, R., Norman, I., Redfern, S., & Murrells, T. (2002). Assessing practice of student nurses: Methods, preparation of assessors and student views. *Journal of Advanced Nursing*, 38(5), 516–523. <https://doi.org/10.1046/j.1365-2648.2002.02213.x> PMID:12028285
- Danner, M. (2014). Comparison of 1 long versus 2 shorter clinical days on clinical learning outcomes of nursing students. *Nurse Education*, 39(6), 280–284. <https://doi.org/10.1097/NNE.0000000000000068> PMID:25061952
- Davis, D. A., Mazmanian, P. E., Fordis, M., Van Harrison, R., Thorpe, K. E., & Perrier, L. (2006). Accuracy of physician self-assessment compared with observed measures of competence: A systematic review. *Journal of the American Medical Association*, 296(9), 1094–1102. <https://doi.org/10.1001/jama.296.9.1094> PMID:16954489
- Fitzgerald, A., McNelis, A. M., & Billings, D. M. (2020). NLN core competencies for nurse educators: Are they present in the course descriptions of academic nurse educator programs? *Nursing Education Perspectives*

- tives, 41(1), 4–9. <https://doi.org/10.1097/01.NEP.0000000000000530> PMID:31860477
- Gaba, D. M. (2004). The future vision of simulation in health care. *BMJ Quality & Safety*, 13(Suppl. 1), i2–i10. <https://doi.org/10.1136/qshc.2004.009878> PMID:15465951
- Green, S., Higgins, J. P. T., Schünemann, H. J., & Becker, L. (2007). Response to paper by Lang A, Edwards N, and Fleiszer A. *Clinical Epidemiology*, 60(6), 598–599. <https://doi.org/10.1016/j.jclinepi.2007.02.001> PMID:17493518
- Hayden, J. K., Smiley, R. A., Alexander, M., Kardong-Edgren, S., & Jeffries, P. R. (2014). The NCSBN national simulation study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation*, 5(2), S3–S40. [https://doi.org/10.1016/S2155-8256\(15\)30062-4](https://doi.org/10.1016/S2155-8256(15)30062-4)
- Helminen, K., Coco, K., Johnson, M., Turunen, H., & Tossavainen, K. (2016). Summative assessment of clinical practice of student nurses: A review of the literature. *International Journal of Nursing Studies*, 53, 308–319. <https://doi.org/10.1016/j.ijnurstu.2015.09.014> PMID:26522265
- INACSL Standards Committee. (2016). Standards of best practice: SimulationSM. *Clinical Simulation in Nursing*, 12(Suppl.), S1–S53. <https://doi.org/10.1016/j.ecns.2016.09.005>
- Ironside, P. M., & McNelis, A. M. (2010). Clinical education in prelicensure nursing programs: Findings from a national survey. *Nursing Education Perspectives*, 31(4), 264–265. PMID:20882871
- Jayasekara, R., Smith, C., Hall, C., Rankin, E., Smith, M., Visvanathan, V., & Friebe, T. R. (2018). The effectiveness of clinical education models for undergraduate nursing programs: A systematic review. *Nurse Education in Practice*, 29, 116–126. <https://doi.org/10.1016/j.nepr.2017.12.006> PMID:29272736
- Kavanagh, J. M., & Szveda, C. (2017). A crisis in competency: The strategic and ethical imperative to assessing new graduate nurses' clinical reasoning. *Nursing Education Perspectives*, 38(2), 57–62. <https://doi.org/10.1097/01.NEP.0000000000000112> PMID:29194297
- Krichbaum, K. (1994). Clinical teaching effectiveness described in relation to learning outcomes of baccalaureate nursing students. *Journal of Nursing Education*, 33(7), 306–316. PMID:7990000
- Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, 77(6), 1121–1134. <https://doi.org/10.1037/0022-3514.77.6.1121> PMID:10626367
- Lang, A., Edwards, N., & Fleiszer, A. (2007). Empty systematic reviews: Hidden perils and lessons learned. *Journal of Clinical Epidemiology*, 60, 595–597. <https://doi.org/10.1016/j.jclinepi.2007.01.005> PMID:17493517
- Liaw, S. Y., Scherpbier, A., Rethans, J. J., & Klainin-Yobas, P. (2012). Assessment for simulation learning outcomes: A comparison of knowledge and self-reported confidence with observed clinical performance. *Nurse Education Today*, 32(6), e35–e39. <https://doi.org/10.1016/j.nedt.2011.10.006> PMID:22064013
- Makarem, S., Dumit, N. Y., Adra, M., & Kassak, K. (2001). Teaching effectiveness and learning outcomes of baccalaureate nursing students in a critical care practicum: A Lebanese experience. *Nursing Outlook*, 49(1), 43–49. <https://doi.org/10.1067/mno.2001.111186> PMID:11182725
- Makary, M. A., & Daniel, M. (2016). Medical error—the third leading cause of death in the US. *BMJ (Clinical Research Ed.)*, 353, i2139. <https://doi.org/10.1136/bmj.i2139> PMID:27143499
- Mancini, M. E., LeFlore, J. L., & Cipher, D. J. (2019). Simulation and clinical competency in undergraduate nursing programs: A multisite prospective study. *Journal of Nursing Education*, 58(10), 561–568. <https://doi.org/10.3928/01484834-20190923-02> PMID:31573644
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA Statement. *BMJ*, 339, b2535. <https://doi.org/10.1136/bmj.b2535>
- Monahan, R. S. (1991). Potential outcomes of clinical experience. *Journal of Nursing Education*, 30(4), 176–181. PMID:1646311
- Nielsen, A. E., Noone, J., Voss, H., & Mathews, L. R. (2013). Preparing nursing students for the future: An innovative approach to clinical education. *Nurse Education in Practice*, 13, 301–309. <https://doi.org/10.1016/j.nepr.2013.03.015> PMID:23591129
- Oermann, M. H., & Kardong-Edgren, S. (2018). Changing the conversation about doctoral education in nursing: Research in nursing education. *Nursing Outlook*, 66(6), 523–525. <https://doi.org/10.1016/j.outlook.2018.10.001> PMID:30389104
- Parchebafieh, S., Gholizadeh, L., Lakdizaji, S., Ghiasvandian, S., & Davoodi, A. (2014). Effectiveness of the clinical teaching associate model to improve clinical learning outcomes: A randomized controlled trial. *Nurse Educator*, 39(4), 202–205. <https://doi.org/10.1097/NNE.0000000000000054> PMID:24937302
- Polifroni, E. C., Packard, S. A., Shah, H. S., & MacAvoy, S. (1995). Activities and interactions of baccalaureate nursing students in clinical practice. *Journal of Professional Nursing*, 11(3), 161–169. [https://doi.org/10.1016/S8755-7223\(95\)80115-4](https://doi.org/10.1016/S8755-7223(95)80115-4) PMID:7602018
- Rahnavard, Z., Nodeh, Z. H., & Hosseini, L. (2013). Effectiveness of clinical teaching associate model in nursing education: Results from a developing country. *Contemporary Nurse*, 45(2), 174–181. <https://doi.org/10.5172/conu.2013.45.2.174> PMID:24299245
- Reljic, N. M., Lorber, M., Vrbnjak, D., Sharvin, B., & Strauss, M. (2017). Assessment of clinical nursing competencies: Literature review. Teaching and Learning in Nursing. Advance online publication. <https://doi.org/10.5772/67362>
- San Lazaro Campillo, I., Meaney, S., McNamara, K., & O'Donoghue, K. (2017). Psychological and support interventions to reduce levels of stress, anxiety or depression on women's subsequent pregnancy with a history of miscarriage: An empty systematic review. *BMJ Open*, 7(9), e017802. <https://doi.org/10.1136/bmjopen-2017-017802> PMID:28882928
- Sullivan, N., Swoboda, S. M., Breymier, T., Lucas, L., Sarasnick, J., Rutherford-Hemming, T., Budhathoki, C., & Kardong-Edgren, S. (2019). Emerging evidence toward a 2:1 clinical to simulation ratio: A study comparing the traditional clinical and simulation settings. *Clinical Simulation in Nursing*, 30, 34–41. <https://doi.org/10.1016/j.ecns.2019.03.003>
- Tanner, C. A. (2006). Thinking like a nurse: A research-based model of clinical judgment in nursing. *Journal of Nursing Education*, 45(6), 204–211. <https://doi.org/10.3928/01484834-20060601-04> PMID:16780008
- Waxman, K. T., Bowler, F., Forneris, S. G., Kardong-Edgren, S., & Rizzolo, M. A. (2019). Simulation as a nursing education disrupter. *Nurs Admin Quar*, 43(4), 300–305. <https://doi.org/10.1097/NAQ.0000000000000369> PMID:31479049
- Whyte, J., IV, Ward, P., & Eccles, D. W. (2009). The relationship between knowledge and clinical performance in novice and experienced critical care nurses. *Heart & Lung*, 38(6), 517–525. <https://doi.org/10.1016/j.hrtlng.2008.12.006> PMID:19944876
- Williams, A., Wellard, S. J., & Bethune, E. (2001). Assessing Australian undergraduate clinical learning. *Collegian (Royal College of Nursing, Australia)*, 8(4), 9–13. [https://doi.org/10.1016/S1322-7696\(08\)60028-1](https://doi.org/10.1016/S1322-7696(08)60028-1) PMID:15484687
- Yaffe, J., Montgomery, P., Hopewell, S., & Shepard, L. D. (2012). Empty reviews: A description and consideration of Cochrane systematic reviews with no included studies. *PLoS One*, 7(5), e36626. <https://doi.org/10.1371/journal.pone.0036626> PMID:22574201

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